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ABSTRACT

A study was conducted to learn whether or not occupational perceptions become more specific or differentiated with age. The study was based on the hypothesis that older people should be able to discriminate more accurately among occupations than younger people as a result of their experience and development. The literature was searched for samples of elementary students, high school students, college students, and employed adults who had taken the Vocational Preference Inventory. Samples were selected to represent each of these levels. The findings supported the hypothesis in providing evidence that perceptions of occupations tend to become more differentiated, and thus more useful, as people get older. (WS)

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INTRODUCTORY STATEMENT

The Center for Social Organization of Schools has two primary objectives: to develop a scientific knowledge of how schools affect their students, and to use this knowledge to develop better school practices and organization.

The Center works through five programs to achieve its objectives. The Academic Games program has developed simulation games for use in the classroom. It is evaluating the effects of games on student learning and studying how games can improve interpersonal relations in the schools. The Social Accounts program is examining how a student's education affects his actual occupational attainment, and how education results in different vocational outcomes for blacks and whites. The Talents and Competencies program is studying the effects of educational experience on a wide range of human talents, competencies, and personal dispositions in order to formulate -- and research -- important educational goals other than traditional academic achievement. The School Organization program is currently concerned with authority-control structures, task structures, reward systems, and peer group processes in schools. The Careers and Curricula program bases its work upon a theory of career development. It has developed a self-administered vocational guidance device and a self-directed vocational guidance system to promote vocational development for high school, college, and adult populations.

This report, a project of the Careers and Curricula program, provides evidence that perceptions of occupations tend to become more differentiated, and thus more useful, as people get older.

Introduction

The perception of occupations plays a key role in many vocational behaviors and in theories of vocational development. From his first job to his last, a person depends upon his occupational perceptions to weigh vocational alternatives. Some interest inventories (the Strong Vocational Interest Blank and the Vocational Preference Inventory) assume that a person's perceptions of occupational items have a useful degree of validity in decision-making. Most theories of vocational development also assume that occupational perceptions have some validity in searching for and considering alternatives, and for comparing one's personal chacteristics to perceived occupational demands (Crites, 1969; Bodden & Klein, 1972; Holland, in press; Super, 1972). So far, the evidence suggests that a person's occupational perceptions are useful for serving these practical and theoretical needs (O'Dowd and Beardslee, 1960, 1967; Schutz and Blocher, 1960; Banducci, 1968; Marks & Webb, 1969).

The purpose of this study is to learn if occupational perceptions become more specific (differentiated) with age. More concretely, because of their experience and development, older people should be able to discriminate more accurately among occupations than younger people. This hypothesis is consistent with many psychological findings (Harris, 1957; Dye and Very, 1968). For example, Dye and Very find that a person's cognitive abilities become more specific with age; consequently, when data about cognitive abilities are factor-analyzed, more factors occur at older than at younger age levels, and the factors found at older ages are more specific than those found at younger ages.

Method

The literature was searched for large samples of elementary students, high school students, college students and employed adults who had taken the Vocational Preference Inventory (Holland, 1965). Samples of males and females were selected to represent each of these age levels. At best, these are simply large and diverse samples from unknown populations. The samples are discussed below:

I. Fourth, fifth, and sixth graders (520 boys and 465 girls). The data were obtained by Lesnik and Barclay (1968), who used a simplified version of the Vocational Preference Inventory (VPI).

II. Rural high school seniors (759 boys and 672 girls). Crabtree (1971) collected the data using the VPI.

III. College freshmen (3771 men and 3492 women) in 31 colleges. Abe, Holland, Lutz, and Richards (1965) collected the data in a survey containing the VPI.

IV. Employed salesmen (N=200). Jeanneret (1971) collected the unpublished VPI data in an employee assessment program.

V. Employed women (N=328). Werner (1969) collected the VPI data from diverse groups of employed women.

The VPI was used to test the main hypothesis -- occupations are perceived more differentially with age -- because the VPI depends entirely upon a person's occupational perceptions. Each VPI scale -- Realistic, Investigative, Artistic, Social, Enterprising, and Conventional-- contains 14 occupational titles which a person responds to by indicating

those occupations he likes or dislikes. His response, then, is based on his perceptions of occupational titles. Those perceptions are assumed to depend upon social class, abilities, self-conceptions, occupational experiences, and so on.

The intercorrelations among the six VPI scales for the five samples were analyzed by both latent root analysis and the minimum residual factor-analysis to test the differentiation hypothesis:

(1) The latent root analysis partitions the total scale variation into orthogonal components. If differentiation occurs in the VPI scale intercorrelations at older age levels, the distribution of variation among the orthogonal components should become more uniform.

(2) The minimum residuals (MINRES) factor analysis identifies the structural relationships among scales in terms of common factors. If differentiation occurs in the VPI scale intercorrelations at older age levels, more factors and more distinct factors should occur.

Results

Latent Root Analyses

The results of the latent root analyses are given in Table 1. The male data clearly support the differentiation hypothesis; the first root decreases in size as age increases.

Insert Table 1

Since the sum of the latent roots of a 6 x 6 correlation matrix is always six, at least one of the remaining five roots must show a concomitant increase. In the male samples, the second and third roots increased in size while the last three roots were approximately equal in size across the four samples.

The percent of total variation accounted for by each root was also calculated. The percentages were obtained by dividing each root by six. The results are shown graphically in Figure 1.

Insert Figure 1

For the elementary male sample, the first root accounted for 61% of the variance. In the high school male sample, the figure decreased to 56%. For both the college and employed adult samples, the first root accounted for only 39% of the total variance.

In the female samples, the patterns of latent roots provide less support for the differentiation hypothesis. While the data for the

high school, college, and employed adults were consistent with the hypothesis, the female elementary sample revealed more occupational differentiation than the high school group but less than the other two groups (see Figure 1). For the female elementary sample, the first root accounted for 47% of the total variance; for the high school sample the figure was 53%; and for the college and employed adult female samples these figures were 41% and 39% respectively.

Minimum Residual Analyses

The results of the minimum residuals factor analyses also support the differentiation hypothesis. The main results in Table 2 show that the older groups require three factors to explain the VPI intercorrelations; whereas the younger groups require one or two factors. The following paragraphs provide a more specific account of the results.

Insert Table 2

Table 2 shows the loadings for the orthogonal MINRES factors after varimax rotation. Three different criteria for the number of common factors (eigenvalues-greater-than-one, discontinuities, and Catell's Scree Test, cf. Rummell, 1971) indicate a change from one to three in the number of common factors between high school and college for both males and females. The same criteria indicated two common factors were appropriate for the female but not the male elementary sample.

The results for the male-elementary and male-and-female high school samples were one-factor solutions. In the female elementary group, the Enterprising scale (loading of -.99 on factor II) was differentiated from the remaining five VPI scales. The results for the college and employed adult samples were multi-factor solutions, and three have similar patterns of loading. In the male-college, female-college and female-employed samples, the Realistic and Investigative scales load together on one factor, the Artistic, Social, and Enterprising load on another, and the Enterprising and Conventional load together on a third factor. The male-employed sample also yielded an Artistic-Social-Enterprising factor but produced an Investigative-Artistic factor and a Realistic-Conventional factor as well.

Discussion

Both the latent root and the minimum residual factor analyses support the differentiation hypothesis: more factors are usually required to account for the occupational perceptions of older groups, and the variation among factors becomes more uniform with increasing age. It is tempting to interpret the differences between successive samples (for example, high school and college) as offering even stronger support, but the unrepresentativeness of the samples militates against this kind of comparison.

The results resemble those in a related study by Cureton (1970). Cureton factor-analyzed the student scores on the Project Talent interest inventories for national representative samples of 8th and 9th

graders, and 10th to 12th graders. At both age levels, Cureton found five and six factors for boys and girls respectively; Cureton's interest factors correspond roughly to Holland's factors. More important, Cureton found that the variance among factors is distributed more evenly among older boys and girls than among their younger counterparts. Her results are especially valuable because they are based upon large representative samples; consequently, differences in differentiation between older and younger students cannot be attributed to sampling errors.

The support for the differentiation hypothesis in these studies raises some related questions for new work: are well-differentiated occupational perceptions a function primarily of age? of amount of occupational information? of amount of self-information? personal characteristics? a combination of all these factors? Can the differentiation of occupation perceptions be accelerated by special experience?

The results in the present study suggest that a person's occupational perceptions might be used to estimate his level of vocational development or maturity (Crites, 1967; Super, 1972); that is, an estimate of a person's ability to differentiate among occupational groups may be equivalent to measures of vocational maturity such as Crites' Vocational Development Inventory.

For example, a person's differentiation score on the VPI (the absolute difference between the highest and lowest scale score) may be

a useful index of a person's vocational development. An earlier longitudinal study indicated that this index was positively and significantly associated with the stability of a student's vocational preference. (Holland, 1968). Further, the correlational matrices in the present study imply that younger people have undifferentiated VPI profiles -- their high intercorrelations indicate that all six occupational groups look equally attractive. The low correlations found for adults imply that they find some occupational groups much more attractive than others. If this hypothesis receives more explicit support, then the VPI, or its closely related counterpart, the Self-Directed Search (Holland, 1970), might be used to assess the ability of vocational treatments to accelerate vocational development. If the treatment is successful, the VPI or SDS should show a more differentiated profile.

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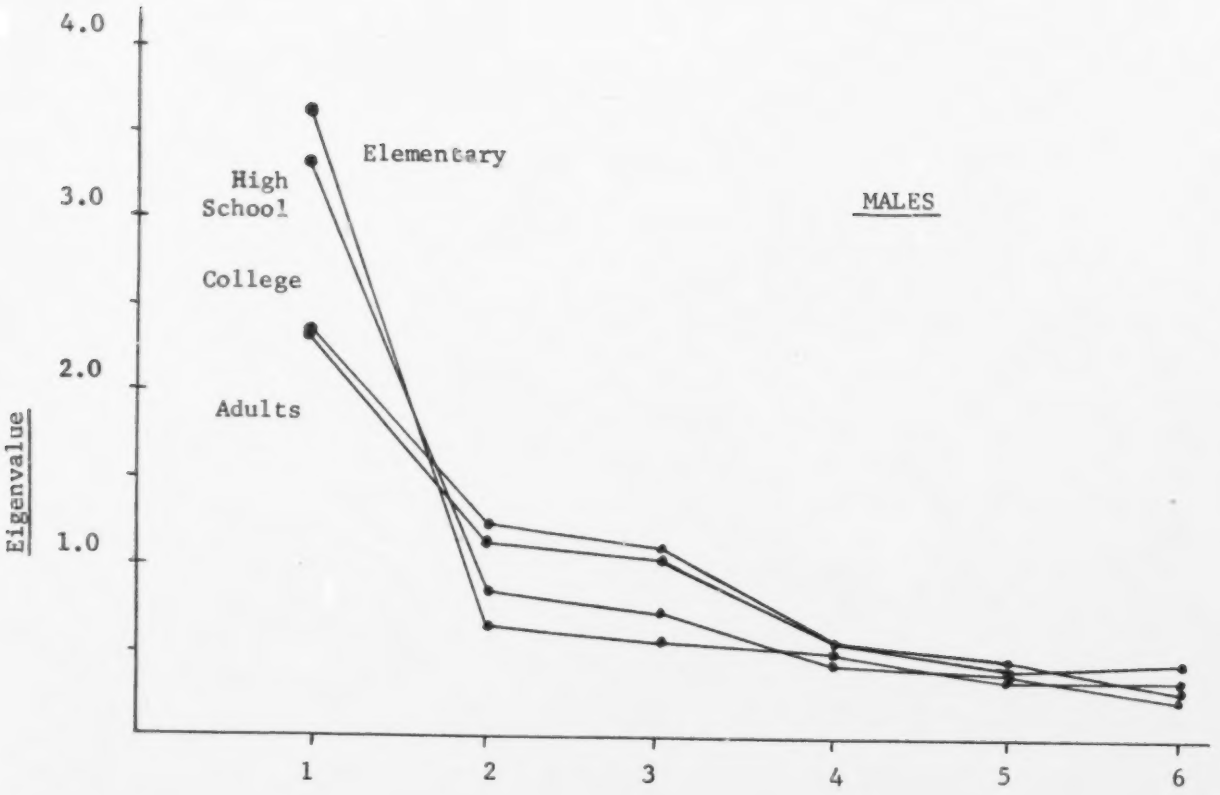

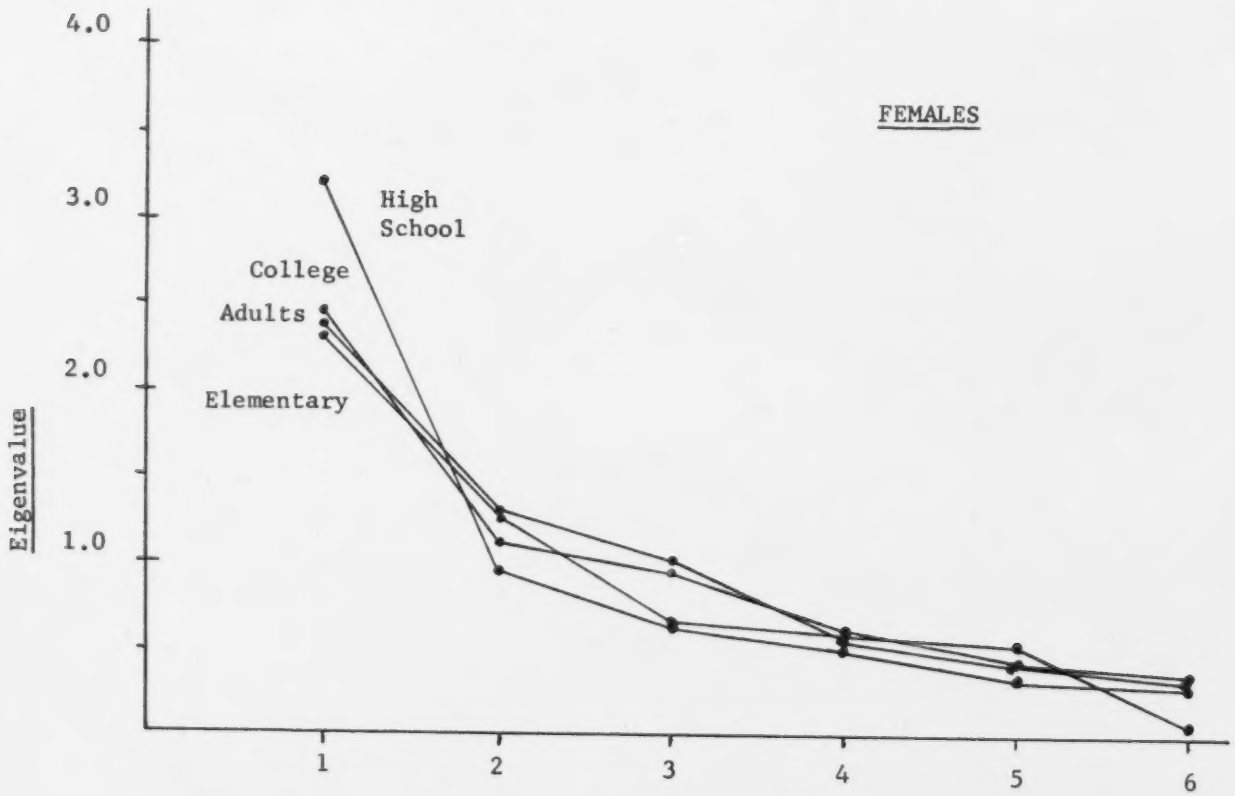

Figure 1. - Plot of Eigenvalues for Four Age Groups Separated by Sex

Table 1

Eigenvalues for Four Male and Female Age Groups

Number of Factors	Sample	Eigenvalue					
		1	2	3	4	5	6
1	Boys 4,5,6 grades	3.63	.63	.57	.50	.35	.31
1	Boys High School	3.34	.87	.72	.46	.36	.25
3	Boys College	2.35	1.21	1.10	.56	.48	.30
3	Men Working	2.33	1.15	1.09	.56	.46	.41
2	Girls 4,5,6 grades	2.33	1.28	.71	.60	.53	.06
1	Girls High School	3.20	.99	.65	.50	.35	.30
3	Girls College	2.48	1.13	.96	.63	.45	.35
3	Women Working	2.36	1.29	1.02	.58	.41	.33

Table 2

Orthogonal MINRES Factors

For Samples at Different Ages

Sample	VPI Scales	Males I	Males II	Males III	h^2	Females I	Females II	Females III	h^2
Elementary School	R	.68				.50	-.35		
	I	.70				.47	-.21		
	A	.65				.59	-.35		
	S	.73				.96	.30		
	E	.80				.09	-.99		
	C	.83				.56	-.45		
		3.23			3.23	2.06	1.58		3.64
High School	R	.55				.65			
	I	.56				.60			
	A	.69				.68			
	S	.75				.70			
	E	.83				.81			
	C	.79				.62			
		2.96			2.96	2.78			2.78
College	R	.31	.49	-.02		-.59	.19	-.23	
	I	-.09	.85	.24		-.81	.00	-.14	
	A	.04	.11	.70		-.29	-.11	-.65	
	S	.30	.09	.54		-.13	.15	-.50	
	E	.72	-.01	.45		-.10	.40	-.71	
	C	.84	.14	.08		-.12	.91	-.16	
		1.42	.99	1.05	3.46	1.12	1.07	1.28	3.46
Employed Adult	R	-.08	.20	-.54		.18	.50	-.28	
	I	-.03	.81	-.25		.16	.90	.09	
	A	-.53	.48	.17		.61	.25	.16	
	S	-.67	.14	-.25		.58	.17	-.17	
	E	-.70	-.06	-.28		.71	.00	-.44	
	C	-.27	-.01	-.70		.11	.07	-.95	
		1.30	.95	1.00	3.25	1.28	1.15	1.24	3.68

Note: all factor loadings over .40 are underlined.

h^2 = communality